

A Kit of Ideas for Motorists

If the Fan Belt Breaks, or You Need Tire Chains in a Hurry, Here's the Remedy—And Some Other Handy Kinks

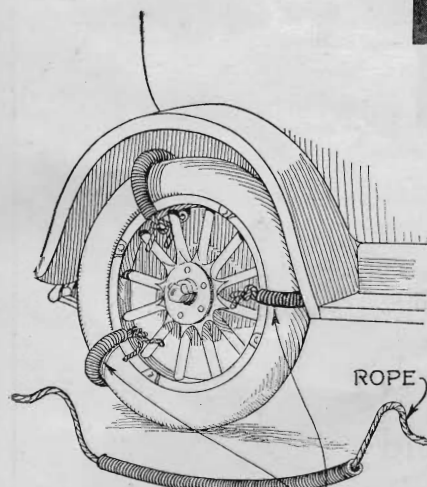
NEGLECT to carry a trouble light in the tool kit of the car may cause no end of annoyance on the road at night in the event of some minor difficulty. However, often it is possible to obtain all the light necessary for a small repair on the ignition system or the carburetor by using a small hand mirror to reflect the beams from the headlight to the desired point. If no hand mirror is available, unscrew the rear view mirror and use that.

Snow Hooks of Hose

WHILE chains of the ordinary type usually will give you traction in snow or mud, it is a dirty



If you have no trouble light, one can be improvised by using a small hand mirror to reflect headlight beams.



PIECES OF OLD GARDEN HOSE

Fig. 1. Emergency tire chains made by threading rope through hose and tying on.

job to apply them. And when most of the route is clear, with only a short section of road in bad shape, chains will come in for a lot of unnecessary wear besides chafing the tires.

Fig. 1 shows a simple solution of the problem. Take pieces of old garden hose and through each piece pass a length of strong rope. When you reach the bad place in the road it is the work of but a few moments to tie them in place as shown. They can be removed with equal facility when the bad part of the road is left behind. Pieces of hose attached in this way are particularly effective in deep, soft snow but they are, of course, no good on ice, where ordinary chains should be used.

Three-Tone Horn

THE note produced by one type of auto horn depends on the voltage applied to it. If your horn

is of this type you can make it sound three different notes by the use of resistances and buttons wired as shown in Fig. 4 at the right.

Two rheostats such as are sold for use in building radio receivers can be used. As you will note from the diagram, pressing the right-hand button allows the current to flow unimpeded to the horn mechanism. Pressing the center button places the resistance of one rheostat in the circuit, and pressing the other allows the current to flow through the second

Ten Dollars for an Idea!

August Grosze, of Collinsville, Ill., wins this month's \$10 prize for his suggestion of a novel bushing press (Fig. 2.) Each month POPULAR SCIENCE MONTHLY awards \$10, in addition to regular space rates, for the best idea sent in for motorists. Other contributions used are paid for at the usual rates.

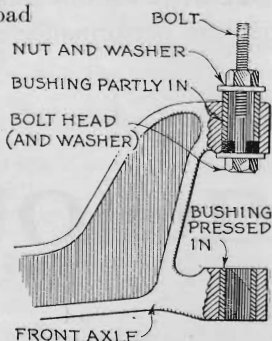


Fig. 2. Bolt, nut and washers are used to press on a king-pin bushing.

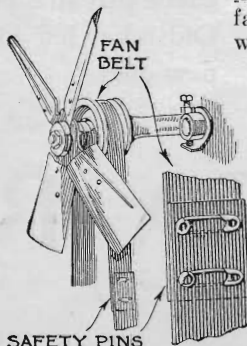


Fig. 3. Fan belt repaired by joining broken ends together with pins.

rheostat. The horn mechanism may require slight adjustment for best results. The resistance of the rheostats will depend on the current drawn by the horn and how much resistance is needed to cause the required change in tone.

Novel Bushing Press

ONE bolt, one nut, and two washers will permit you to press king-pin bushings, or any similarly assembled bushing, into place just about as well as it can be done in an arbor press. And there is no risk of deforming the edge of the bushing, as there would be if you pounded it into place. Fig. 2 shows the method.

The bolt should be a loose fit through the hole in the bushing, and the washers should be some-

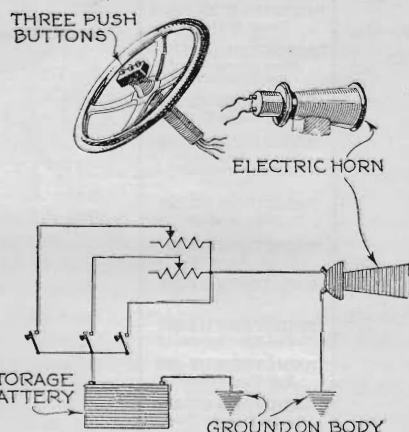


Fig. 4. This diagram shows how to wire horn to produce any one of three tones.

what larger than the outside diameter of the bushing. If the washers are thin, use two or three at each point.

Fan Belt Repair

IF YOUR auto motor is equipped with a plain, flat fan belt made of either fabric or leather, it is possible to repair it well enough to get to the nearest service station. You will have to loosen the belt-tightening adjustment to obtain the necessary slack so that you can overlap the ends, and fasten them together with safety pins, as shown in Fig. 3. If that is not possible, you can pin a thin piece of leather to the two ends to hold them together.

If the distance to the service station is not too far, tying the ends together with a strong cord may serve as an emergency repair. The belt should be replaced with a new one as soon as possible.

The Month's Best Auto Ideas

Handy Kinks That May Save You Trouble or Get You Out of It—An Ingenious Opener for Garage Doors



Fig. 1. Incision in radiator, after the shell is removed, gives access to obstructing particles.

THE "neck of the bottle" in an automobile radiator is at the top of the cooling fins or tubes. Any foreign matter that floats around with the water always gets stuck at this point and the result is retarded circulation and a tendency for the motor to overheat.

Ordinary flushing will not remove serious obstructions. But you can get them out by the simple method shown in Fig. 1. Remove the radiator shell and with a sharp, strong knife make a curved incision. Then fold out the flap thus formed. Pick out the obstructions with a pointed instrument, push the flap back in place, and solder it. Radiators are made of thin sheet brass so this is easier than it looks.

A Tool Compartment Lock

A COMMON location for the tool compartment in the sedan or coach is under the front seat. Usually it is neces-

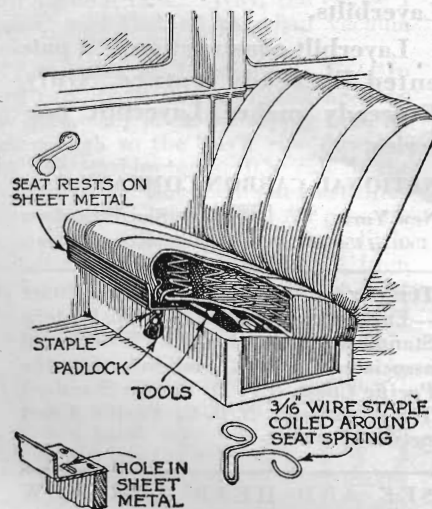


Fig. 2. By preventing lifting of the seat, this lock safeguards the contents of your tool compartment.

Ten Dollars for an Idea!

G. Solomon, of Puerto Plata, Santo Domingo, wins this month's ten-dollar prize for his suggestion of a garage door opening device (Fig. 3). Each month Popular Science Monthly awards \$10, in addition to regular space rates, for the best idea sent in for motorists. Other contributions used are paid for at the usual rates.

sary to raise the front of the seat cushion and pull it forward in order to lift it out to get at the tools.

You can fit a lock, as shown in Fig. 2, that will prevent lifting the front edge of the seat cushion and thus prevent the theft or unauthorized use of your tools when the car is stored in a public garage.

Both Doors Open At Once

FIGURE 3 shows a novel fitting for any double garage doors. It is designed so that when you open or shut the door at

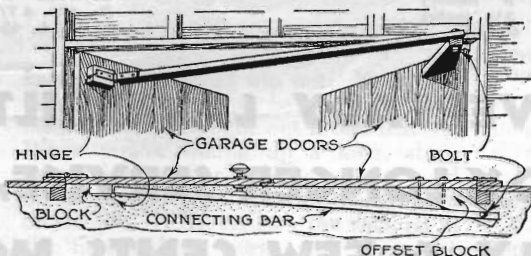


Fig. 3. Side and top views of the ingenious device for making double doors open at the same time.

the left in the illustration, the other door will open or shut automatically. The material you need consists of a board of sufficient length, three bolts, a strong iron hinge, and wood screws.

As you open the door at the left, a connecting bar, pulled along with it, opens the door at the right by pulling on the end of the offset block. In closing, the thrust of the connecting bar closes the door at the right.

Blowing Starts Siphon

AN INGENIOUS way to siphon gas from the tank of your car is illustrated in Fig. 4. Insert one end of a rubber tube deep into the gas tank; the other into a container. Then, wrapping your fingers around the tube where it enters the tank so as to make as air-tight a connection as possible, blow into the tank. The pressure will force the gasoline out.

You may find that a tighter connection can be made by wrapping your pocket handkerchief around your fingers.



Fig. 4. Blowing into the auto gas tank forces gasoline through a siphon tube into a container.

When the Battery Is Dead

IF THE battery is so low that the car won't start, even with the hand crank, a couple of flashlight batteries will do the trick. Fig. 5 shows how to connect them. Remove the ignition coil wire leading to the ignition switch, and replace it with a wire from one end of the two flashlight batteries connected in series (you must have at least four cells). Then connect the other end of the two batteries to the metal crank case.

Crank the motor, and when it starts, speed it up to send a charge through the storage battery. A few minutes' run will put enough charge in the battery so you can start the car again with the crank.

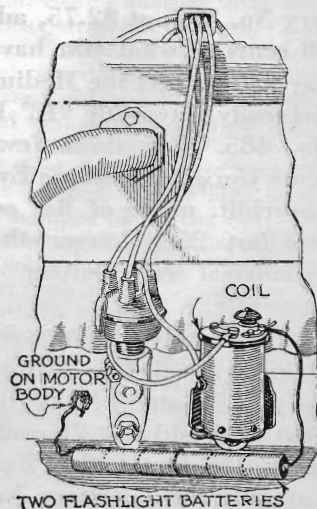


Fig. 5. How to wire two flashlight batteries to start the motor when storage battery is discharged.

You May Find Use for These Handy Short Cuts for Car Owners

How to Fix a Broken Spark Plug, or Keep the Rain Out of the Ignition—Easy Way to Build Garage Door Stops

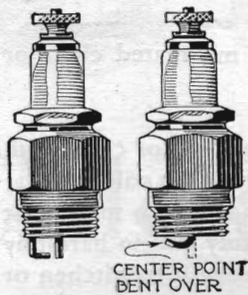


Fig. 1. If the outer point breaks, bend the inner point over close to the rim.

TWO common causes of spark plug failure are carbonization and burned or broken electrodes. An emergency repair for a broken electrode is shown in Fig. 1. Here the outer electrode is broken off. To make the spark plug work, simply bend the center electrode over close to the rim of the shell. This can be done, however, only if the center electrode is long enough.

A "Raincoat" for Ignition

WHEN a driving rainstorm blows drops of water through the louvers in the hood and the moisture gets all over the distributor head, many car owners have found to their sorrow that the motor will not start. The high tension current leaks away through the moisture instead of jumping the gaps in the spark plugs.

Figure 2 shows a novel way to get rid of this trouble. Take a child's rubber ball slightly larger in diameter than the distributor head and cut off the lower portion as shown. Next punch small holes for the ignition wires. They should be so small that you will have to force the

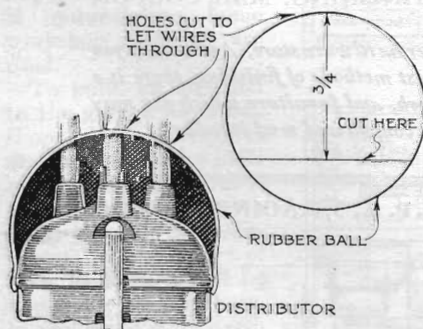


Fig. 2. Three quarters of a rubber ball, fitted like a cap over the distributor head, with holes for the wires, guards ignition from moisture.

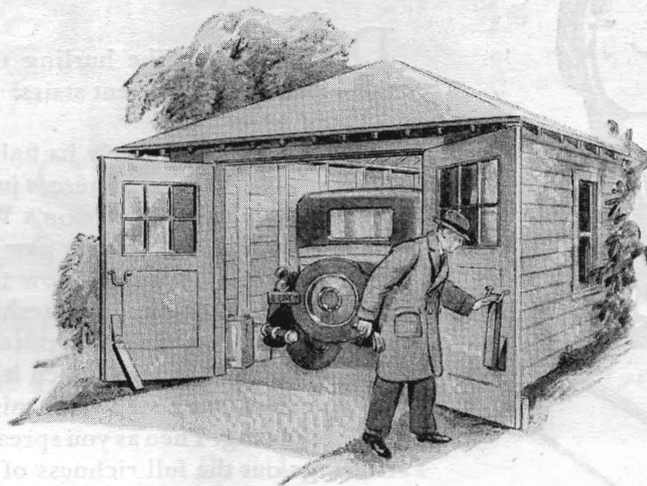


Fig. 3. These easily built garage door stops are made of hinged boards which fold upward and are held by latch when not in use.

wires through them. The edge of the large hole is pulled down around the edge of the distributor. If the ignition wires are good, this arrangement will be so nearly waterproof that you could pour a pail of water over the distributor head without affecting the operation of the car.

Handy Garage Door Stop

FOR a simple and effective garage door stop, all you need is four pieces of board, some wood screws, four screw eyes, a foot of heavy wire, and two cheap strap hinges.

The illustration of Fig. 3 shows the construction. Two short pieces of board are fastened to the doors with wood screws, and to these are hinged two lower pieces which serve as the stops and swing upward when not in use. Then a pair of screw eyes are placed on each door, level with the points where the upward swinging stops strike the doors. To these the wires are fastened and bent to form two latches.

Ten Dollars for an Idea!

W. Conway, of Syosset, N. Y., wins this month's \$10 prize for his suggestion of a piston ring compressor, shown in Fig. 4. Each month POPULAR SCIENCE MONTHLY awards \$10, in addition to regular space rates, for the best idea sent in for motorists. Other contributions used are paid for at the usual rates.

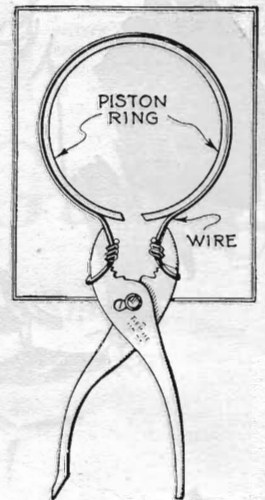


Fig. 4. Novel piston ring compressor made from pliers.

Piston Ring Compressor

FIGURE 4 shows an effective piston ring compressor made of a pair of adjustable pliers and a piece of strong iron wire. Success depends on how carefully you fit the ends of the wire to the jaws of the pliers. By fitting the wire so that the ring stands at right angles, it is possible to use this compressor in close quarters.

Sticking Tires Remedied

WHEN tires are left undisturbed on the rims for a long period, they frequently are rusted so tightly to the rims that it is extremely difficult to remove them. This sticking can be eliminated by fitting a band of zinc around the rim. Use thin stock for this work.

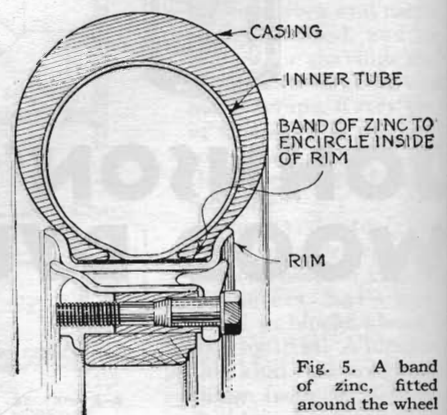


Fig. 5. A band of zinc, fitted around the wheel rim, prevents tires from sticking to the rim.

Fix It Yourself with These Handy Hints for Motorists

How to Keep Your Windshield Wiper Working, Build a Nest for Tools, Grind Valves an Easy Way, or Rig a Siphon

THE average windshield wiper goes bad long before it is worn out. Constant contact with the surface of the glass puts a kink in the rubber edge so that it will not bend back and forth to clean the glass as it should. Fig. 1, below, shows how to avoid this deterioration.

Take a small piece of sheet metal and bend it into a triangular shape. Then cut or file small notches in the upper edges. When the windshield wiper is not in use, the sheet metal piece is slipped over the wiper.

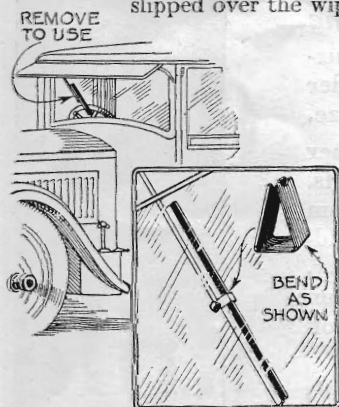


Fig. 1. Small metal guard stops warping of rubber windshield wiper.

er so that the hinge pin will rest in the notches and the rubber will be held away from contact with the glass. This will prevent the rubber from taking a permanent set.

Convenient Tool Pockets

THE coach type of auto body usually has the front seats so they can tip forward to give access to the rear seats.

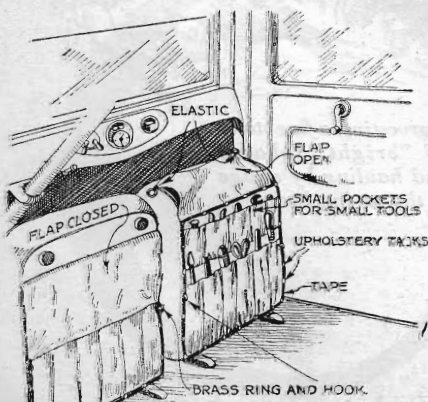


Fig. 2. Handy tool pockets can be rigged with canvas flaps under coach-body seats that tilt up.

Hinges support these seats at the front and feet are provided at the rear so that there is a space between the bottom of the seat and floor of the car. You can utilize this space for two handy tool pockets, as shown in Fig. 2. Each pocket should be fitted with a flap held tight either by rings and hooks or by snap fasteners. The arrangement of the tools and the number of pockets will be governed by the space available.

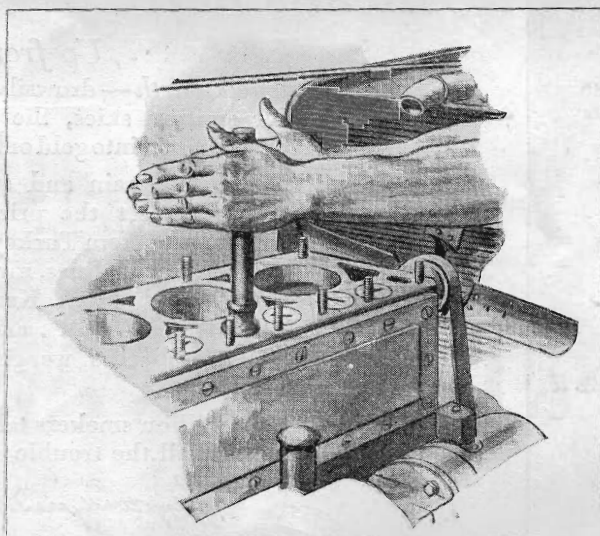


Fig. 3. Cut off a plumber's force cup to fit the valve head and you have a simple grinding device.

Trick Valve-Grinding Tool

AN ORDINARY plumber's force cup, such as is used for clearing clogged drain pipes, can be fashioned into a useful valve-grinding tool. The lower part of the rubber cup is cut off so that the diameter of the remaining portion is smaller than the diameter of the head of the valve. Pressing the cup tightly against the valve will cause the rubber to adhere so the valve can be rotated and lifted from time to time, as shown in Fig. 3.

Ten Dollars for an Idea!

R. L. Ogden, of Edgewater, Colo., wins this month's \$10 prize for his suggestion of a valve-grinding tool, as shown in Fig. 3. Each month POPULAR SCIENCE MONTHLY awards \$10, in addition to regular space rates, for the best idea sent in for motorists. Other contributions used are paid for at the usual rates.

A Self-Starting Siphon

INSTEAD of sucking rubber hose to start gasoline siphoning out of a tank, construct the neat siphon shown in Fig. 4. Bend a piece of brass or copper tubing into a U shape. To one end attach a rubber bulb like photographers use. To the other attach a piece of hose. Then drill a hole in the tube at the bend. Insert the rubber tube in the tank and squeeze the bulb. Press your finger tightly over the hole and release the bulb. Remove your finger and gasoline will flow from the hole in the pipe. The hole must be below the level of the gasoline in the tank.

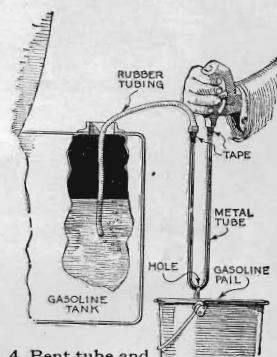


Fig. 4. Bent tube and bulb a handy siphon.

Running-Board Tire Rack

FIGURE 5 shows a convenient and simple running-board tire holder that can be made from a block of wood, some strap iron, and five bolts. As shown, the arrangement is for a rim fitted with four lugs, but it will work with other numbers of lugs, if necessary. Make sure that the tire is held rigidly in place.

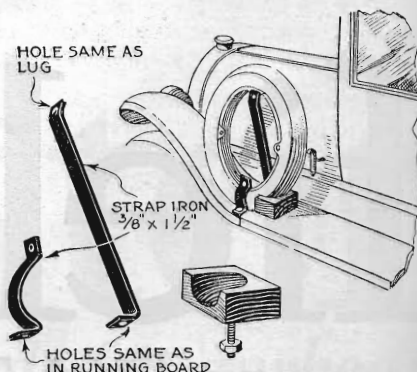


Fig. 5. A wooden block, strap iron, and five bolts compose this running-board tire holder.

Ingenious Ideas for Motorists

How to Check Ignition Timing—An Automatic Light for Luggage Compartments—Timesaving Tools You Can Make

THE ignition system of most cars is so timed that when the spark lever is in full retard position, the spark will occur at top dead center. It is, however, not easy to know just when the breaker points actually part company and cause the spark. You can determine exactly when this happens by the aid of a small mirror. Set it where it will reflect the face of the ammeter, as in Fig. 1, while you turn the hand crank. When the points break and the spark occurs, the ammeter needle will flip back to zero.

You can use this test to check the ignition timing, in which case turn the crank until the needle flips back and then see if the piston is at the top; or to make sure that the piston in any cylinder is at the proper point for setting clearance of the valves. When the spark occurs, both exhaust and intake valves are, of course, closed.

An Automatic Light

NO NEED to fish around in the dark trying to find something in the luggage compartment. You can easily arrange an automatic light which will go on when the trapdoor is lifted, and go out when you close it, as in Fig. 2. A socket of the bayonet type to hold a headlight bulb is attached underneath the front edge of the door opening, and a stop-light switch is attached at a point where it can be connected by means of a chain to the hinge or to a screw eye in the door.

The chain should be adjusted with enough slack so that when the door is in a fully opened position, the switch will be thrown on. Run a wire from the ungrounded battery terminal to one terminal of the socket, connect the other terminal of the socket to one terminal of the stop-light switch, and ground the other terminal of the switch to the nearest point on the metal frame of the car.

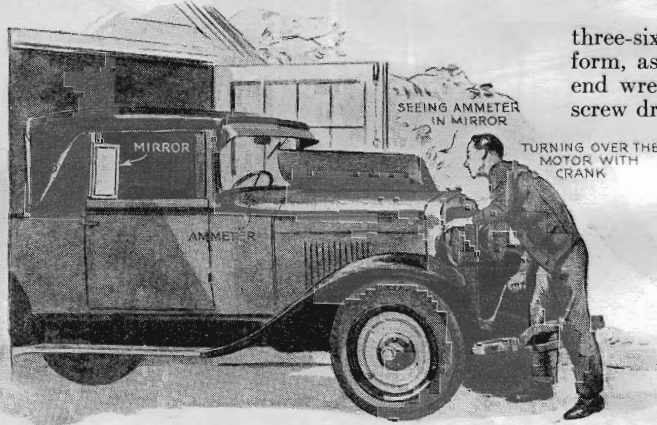


Fig. 1. By watching the ammeter needle in a mirror, as shown, you can see when spark occurs and check the timing.

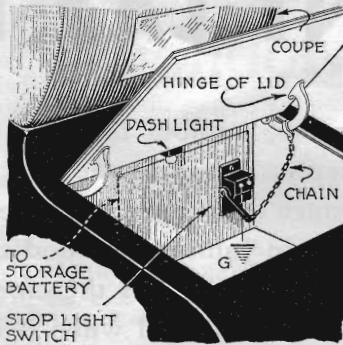


Fig. 2. Automatic light for luggage compartment goes on when lid is up.

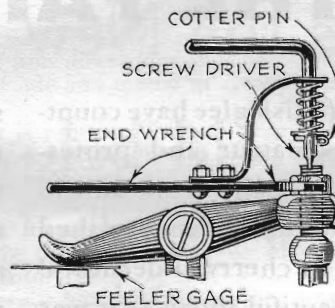


Fig. 3. Timesaving tool for adjusting overhead valves fitted with slotted bolt and lock nut.

Ten Dollars for an Idea!

H. T. Goshon, of Pasadena, Calif., wins this month's \$10 prize for his suggestion of a valve adjusting tool, shown in Fig. 3. Each month POPULAR SCIENCE MONTHLY awards \$10, in addition to regular space rates, for the best idea sent in for motorists. Other contributions that are published are paid for at the usual rates.

Valve Adjusting Tool

FIGURE 3 shows a homemade tool that will be a timesaver for either the garage mechanic or the motorist who does his own repairing in adjusting overhead valves that are fitted with a slotted bolt and a lock nut. Its advantage is that you do not have to remove the screw driver from the slot each time you test the clearance between the valve stem and the end of the rocker arm. The spring holds it securely in the slot.

To make this tool, take an end wrench that fits the lock nut. Bend a piece of

three-sixteenth-inch cold rolled stock into form, as shown, and bolt the end to the end wrench after drilling a hole for the screw driver bit. A cotter pin, a washer, and a spring complete the assembly.

To use the tool, fit the wrench over the lock nut while pulling the screw driver bit up against the spring. Let the screw driver edge drop into the slot, loosen the lock nut, test the clearance while still holding the wrench in place, turn screw driver to change clearance, and when you have it right hold screw driver in the correct position with one hand while you tighten the lock nut with the other.

This tool has saved much time in the repairing of cars with overhead-valve motors.

Spring Compressor

IF YOU have no spring compressing tool and you wish to remove the retaining pin that fits through a slot in the overhead type of valve spring, you can use a pair of end cutting pliers, as shown in Fig. 4. Into holes drilled in a small piece of wood, set the handle ends of the pliers

just far enough apart so that the jaws will clear the valve stem. All that is necessary then is to press down on the wooden handle and remove the pin. Grip a leg of the pliers between the thumb and first finger while you are pressing down to avoid pinching your finger if the pliers slip sidewise.

A Simple Hood Protector

WHILE gasoline has practically no effect on the lacquers used on modern automobiles, it does leave marks which must be polished off. If your car is fitted with a gasoline tank under the cowl, you can avoid spotting by making a protector as shown in Fig. 5. The hole in the protector should fit tightly around the filler opening.

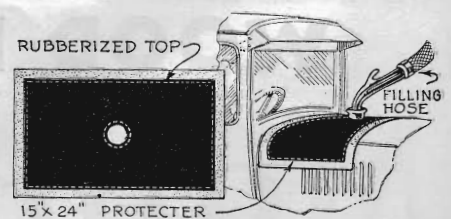


Fig. 5. How to protect automobile finish from gasoline stains when the tank is under the cowl.

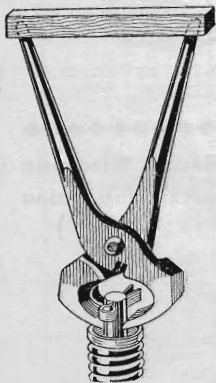


Fig. 4. Small piece of wood converts pliers into spring compressing tool.

Useful Kinks for Car Owners

Making the Driveway Safe from Punctures—How to Rig Up a Bushing Press—Ideas Others Have Found Helpful

ONE reason why motorists have fewer punctures than in the early days of the game is that many more roads are hard surfaced, and that tacks, nails, and other tire damaging objects falling on the road are shared among a much larger number of motorists. That is why you are most likely to get a puncture on an infrequently traveled dirt road. The driveway to your own garage may be particularly bad. Nails and metal scrap falling in the driveway when the house was built stay there until picked up by your tires.

If you don't believe it, try fastening a number of old magneto magnets to a piece of board with a rake handle, as

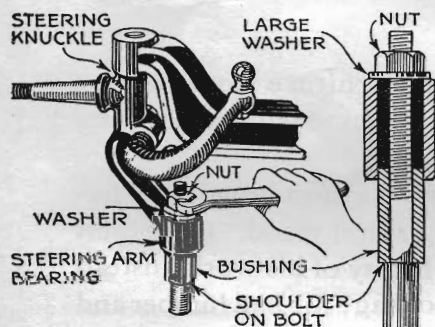


Fig. 2. Simple method of forcing bushing into place, using special bolt with nut and washer.

shown in Fig. 1, then drag the rake back and forth on your driveway. You will be surprised at the number of potential puncture producers you pick up.

A Simple Bushing Press

DRIVING a bronze or brass bushing into place with a wooden mallet often is difficult and always is hard on the mallet. A much simpler way to force the bushing into place is shown in Fig. 2. Make up a special bolt with the shank slightly smaller than the hole through the bushing. The shoulder on the bolt should be square so that it will not injure the edge of the hole. By turning the nut you can pull the bushing into place easily. This method of inserting a bushing often will save dismounting the part to get it into the arbor press and may permit a job to be done where the shape of the part is such that it is hard to get at with the press. Best results will be obtained if the bolt is cut with a fine thread.

Note that when a bushing is forced into place the hole actually is reduced in size sufficiently to cause a jam if the bolt is made too close a fit.

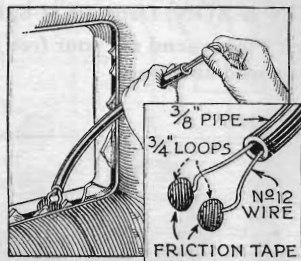


Fig. 3. Ingenious wire grips for extracting broken glass.



Fig. 1. Cleaning the driveway of nails, metal scraps, and other tire puncturers is easy with this magnet-rake, made by fastening old magneto magnets to a piece of board with a rake handle attached, as pictured at right.

WILLIAM J. DOUGLASS, of Missouri Valley, Ia., wins this month's \$10 prize for his suggestion of a magnetic rake, shown in Fig. 1. Each month POPULAR SCIENCE MONTHLY awards \$10, in addition to regular space rates, for the best idea sent in for motorists. Other contributions that are published are paid for at the usual rates.

Broken Glass Extractor

FISHING out the broken pieces of a window is difficult without some special means for grasping the edge of the glass. Fig. 3 shows how to make a tool that makes the job exceptionally easy. Take a piece of galvanized steel wire, bend it double, and form a small loop on each end. Tape these loops with ordinary friction tape. Then put bends in the wire, as shown, and pass the folded wire through a piece of 3/8-inch pipe. The bends in the wire near the small

loops should be so gaged that when you pull on the wire the end of the pipe will force the small loops together. To use the tool push it down into the crack and feel around until the tape-covered loops are on opposite sides of one of the broken pieces of glass. Then, while holding the pipe stationary, pull up on the wire and the glass will be gripped tightly enough to pull it out.

Filtering Out the Dust

THE level of the gasoline in the float chamber of a carburetor is controlled by a small needle valve operated by the rising and falling of the float. The action of this valve necessarily must be delicate since there is little power available to

operate it. The valve itself consists of a tapered seat with a tapered pin that is ground in to make a gasoline-tight joint. If the valve does not make a tight joint, gasoline will seep past and raise the level in the float chamber above the opening in the spray nozzle and it will flow out through the spray jet and leak out of the carburetor in a steady drip.

If the valve is properly ground in, the only possible cause of such a leak is a tiny piece of foreign matter such as a piece of dust lodging between the ground faces and keeping them apart. In localities where there is much dust a frequently unsuspected source of trouble is the vent pipe of the vacuum tank. Air is drawn into this pipe part of the time, and dust goes with it. Fig. 4 shows a cure for this trouble. The vent pipe is brought back through the dash and the end is covered with a piece of old stocking material that will filter out the dust.

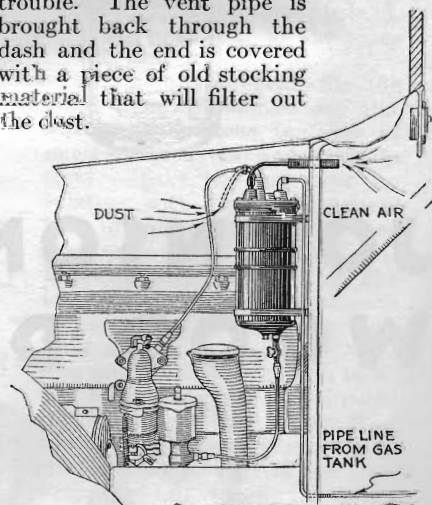


Fig. 4. How you can prevent dust particles from entering vent pipe of the vacuum tank.

Handy New Kinks for Motorists

If You're Stalled in the Rain

A Fire Extinguisher Will Help You "Put Out" the Dampness—Ideas and Tools Others Find Helpful

OFTEN when a car has stood for hours in the rain, wet high tension wiring, spark plugs, and distributor head sometimes result in a dead ignition system. At the right is shown an emergency method of getting started. Take your fire extinguisher and squirt some of the solution it contains on the distributor head, wires, and spark plugs. Do not use too much. The extinguisher liquid is carbon tetrachloride. It will carry away the moisture and then itself disappear by evaporation.

Finding Loose Bearings

IF MYSTERIOUS knocks and noises in the motor make you doubtful about the condition of your connecting rod bearings, the next time you take off the head to scrape the carbon and grind the valves press a plumber's force pump against the head of a piston, and attempt to move the piston up and down, as shown in

Fig. 1. Testing for loose wrist pin or connecting rod bearing with a plumber's force pump.

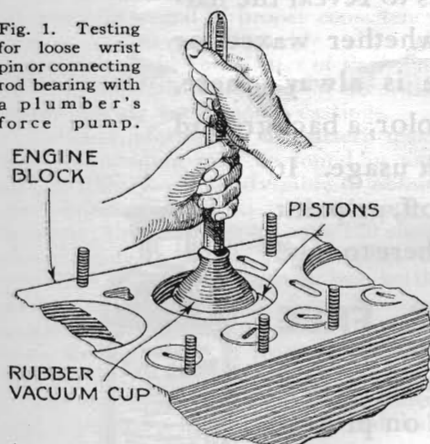


Fig. 1. Any appreciable motion indicates that either the wrist pin or connecting rod bearing is loose, and perhaps both.

Light for the Gas Gage

THE experience of getting stuck on the road at night with an empty gas tank often is due to inability to read the gage on the tank owing to lack of light. A remedy for this trouble is shown in Fig. 2. If there is no spare tire or other intervening object between the tail-light and the gage, simply drill a small hole in the side of the tail-light, so that a beam will be projected directly on the dial. If you are careful to get the hole in exactly the right place, it can be very small. Try a



Fire extinguisher fluid dries out rain-soaked ignition system and helps start the motor.

RUSSELL MARTIN, of Turners Falls, Mass., wins this month's \$10 prize for his suggestion for illuminating the gasoline gage, shown in Fig. 2. Each month POPULAR SCIENCE MONTHLY awards \$10, in addition to regular space rates, for the best idea sent in for motorists. Other contributions used are paid for at the usual rates.

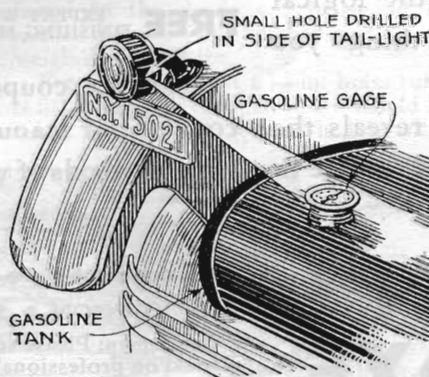


Fig. 2. A small hole drilled in side of tail-light illuminates gas gage on tank for night reading.

small hole to start with and if the beam of light doesn't hit the gage, you can enlarge the hole with a small rat-tail file. If the tail-light is shielded from the gage, so a direct beam of light is impossible, use a small mirror to reflect the beam.

Simple Pipe Flaring Tool

CERTAIN types of gasoline pipe unions require that the end of the pipe be belled out into a smooth flare. Flaring the pipe can be done easily by the tool shown in Fig. 3. Take a finishing nail and bend a kink in it as illustrated. Cut off the head of the nail so it can be held in the chuck of a hand drill. The end of the pipe should be clamped in a vise, using grooved wood blocks to prevent crushing it. Rotating the nail will form a smooth flare on the end of the pipe. The turning motion should be slow and the pressure relatively heavy to obtain the best results.

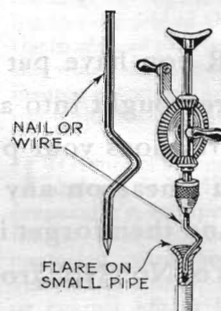


Fig. 3. A bent finishing nail, used in a hand drill, makes useful tool for flaring a pipe end.

Cleaning the Starter

THE bendix type starter will not work perfectly unless it is kept clean and free from oil. It should never be lubricated. In most cars the bendix drive is inclosed in the fly-wheel housing, and while the housing is supposed to be

free from oil, some oil may be thrown on the bendix from the clutch mechanism. The usual method of cleaning the bendix is to remove the starter motor. You can, however, drill and tap a hole in the fly-wheel housing at a point where an oil can spout inserted in the hole will squirt cleaning gasoline on the bendix parts, as shown in Fig. 4. Do not use kerosene as the cleaning fluid because enough of it will adhere to the parts to collect dust and cause gumming.

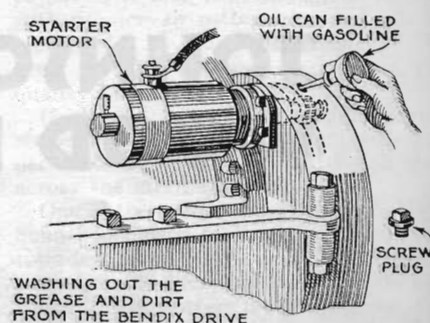


Fig. 4. A simple method of cleaning the bendix drive without removing the starter motor.

Helpful Ideas for the Car Owner

A Handy Floor Board Tool Box—Fitting the Piston Rings—Ingenious Indicators—Locking the Gas Tank

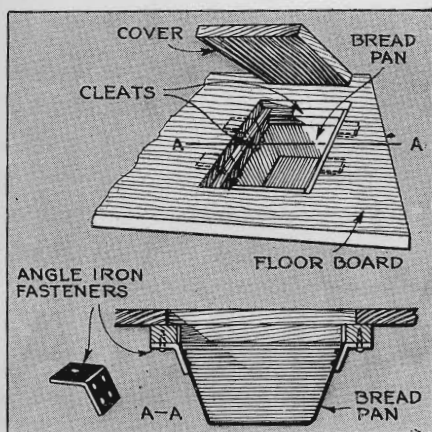


Fig. 1. How to construct an ingenious and simple floor board tool box from an ordinary bread pan.

A NEAT and simple floor board tool box made from a bread pan is shown in Fig. 1. To install, cut out a piece of the floor board with a keyhole saw. Underneath the opening nail two strips to form a support for the piece you have sawed out, which will be the cover of the box. To this strip fasten four angle iron pieces set as shown in the drawing.

If you use another kind of pan—for instance, one with straight sides—it will be necessary to rivet or bolt the sides of the pan to the angle iron pieces. The tool box can be located at any point where the play of the springs will not cause any part of the running gear to hit it. An advantage of this type of tool box is that it is concealed by the floor mat and consequently there is little chance of the tools being stolen.

Stop Light Indicator

THE common method of hooking the dash light in series with the tail-light, using three-volt bulbs at each point, works nicely with the tail-light, but the system does not work with the stop light, which uses a much more powerful bulb, for no one wants a large bulb shining from the dash. The wiring arrangement shown in Fig. 2 eliminates this difficulty. A one-and-a-half-

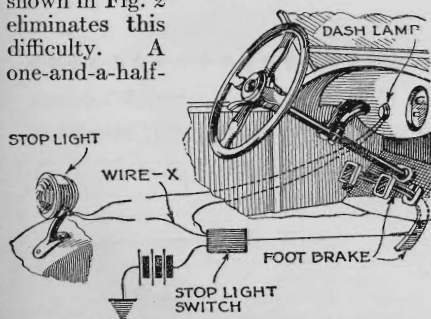


Fig. 2. The prize winner—the arrangement of a novel flashlight indicator that tells condition of stop light.

Ten Dollars for an Idea

James Pesek, of Chicago, Ill., wins this month's \$10 prize for his suggestion for a stop light indicator, shown in Fig. 2, in lower left-hand corner of page. Each month *POPULAR SCIENCE MONTHLY* awards \$10, in addition to regular space rates, for the best idea sent in for motorists. Other contributions used are paid for at usual rates.



Fig. 3. A tin can with top and bottom removed aids in sliding new piston rings into piston grooves.

volt flashlight bulb is connected across the wire that leads to the stop light from the stop light switch. When current flows through a wire, there is a loss in voltage which can be read by means of a voltmeter connected at both ends of the wire. The flashlight bulb requires very little voltage to make it glow, and the drop in voltage in the wire leading to the stop light is sufficient to operate it. The beauty of the system is that if the stop light bulb burns out the flashlight cannot light, but if the flashlight burns out it will not affect the operation of the stop light. If the flashlight does not glow brightly enough add a few feet to the wire marked X in the diagram.

Installing Piston Rings

ONE of the simplest ways to fit piston rings to the grooves of a piston is to take a tin can slightly smaller than the diameter of the piston and cut away the bottom and the top and slit it on one side. Slide the rings on to the can, as shown in Fig. 3. Push the can down over the top of the piston until the edge of it is at the edge of the lowest ring groove. Slide one of the rings down into the groove. Pull the can back to next groove, and so on.

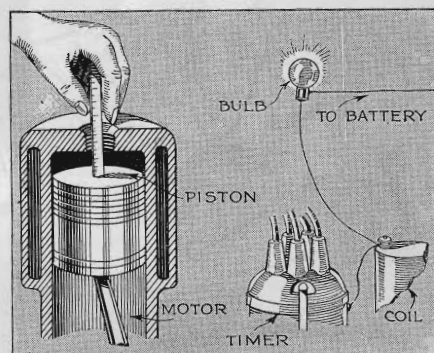


Fig. 4. When the timer contacts are closed, the bulb lights; when they break, the light goes out.

Spark Time Indicator

IT IS difficult to locate the exact point at which the contacts in the timer break and thereby cause the spark in the cylinder. You can, however, wire an electric light bulb, as shown in Fig. 4, to get an absolute indication of the exact moment when the contact breaks. One terminal of the bulb is wired directly to the battery and the other to the terminal of the coil that is connected to the timer. When the contacts are closed the bulb will light. When the contacts break, the bulb will go out.

This method of timing or checking the ignition system is one which will be found helpful not only to the garage mechanic but to the motorist who works on his own car in his spare time. It does away with guesswork, and because of its simplicity of operation saves considerable time on the job.

Locking Your Gasoline

GASOLINE thieves will be foiled by the fuel tank cap lock shown in Fig. 5. This is an ordinary small cabinet door lock which should be riveted, or screwed and riveted, to the under side of the tank cap. Make sure that the lock does not project far enough to interfere with placing the cap on the tank. Mark where the bolt of the lock comes when the cap is tight down and cut a slot in the inside of the opening into which it may drop when the key is turned.

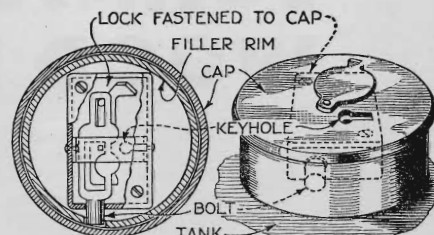
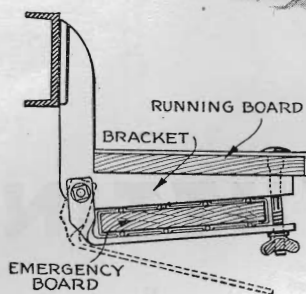


Fig. 5. This fuel tank cap lock is an ordinary small door lock riveted or screwed in place under cap.

When You're Stuck in a Mudhole

Here's an Emergency Device That Will Get Your Car Out—Other Ingenious and Useful Ideas for Motorists

EVEN the motorist who sticks to the main highways sometimes encounters a mudhole on a detour, so that the idea shown in Figure 1 for extricating a mired car is one which any auto owner may find useful. As indicated in the diagram, brackets are built with clamps to hold special boards beneath the running boards. These special boards should be of good hardwood and should be covered on both sides with wire lath. If only one wheel becomes stuck in the mudhole loosen the clamps holding the board on the side that is stuck and shove the board under the wheel for traction. You will find that the wheel will ride out of the



Special hardwood boards, carried under the running boards for emergency, are useful in freeing a mired car.

Fig. 1. This diagram shows how the emergency board is carried. Wire lath on both sides gives traction.

Ball an Aid to Steering

THE only way of assuring ease in steering with modern balloon tires is to have the gear ratio between the steering wheel and the front wheels extremely low. This means that you must turn the steering wheel a considerable distance in maneuvering the car. In ordinary driving this extreme steering motion causes no inconvenience, but if you have to maneuver the car back and forth several times to get into and out of your garage you will find that an aluminum ball, fitted as shown in Figure 3, will prove a big help. You can grasp the ball and spin the steering wheel the necessary amount without releasing your hold.

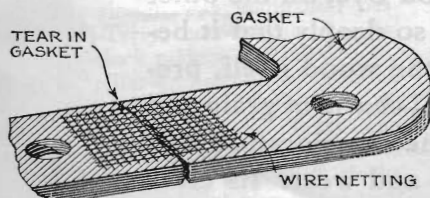


Fig. 2. How to mend torn fabric gasket temporarily by placing wire netting over the tear.

hole. If both wheels are stuck use the boards on both sides. The wire lath is necessary on the top of the board to give the tires traction, and is needed on the bottom to keep the board from sliding through the mud.

Novel Gasket Repair

AN EMERGENCY repair for a torn fabric gasket, in the event that a new one cannot be obtained, can be made by placing a piece of wire netting over the tear, as shown in Figure 2. With care a gasket replaced in this manner will hold for some time with little sign of leakage.

The wire netting serves to prevent the pressure from blowing the ends of the gasket out and causing a bad leak. Of course, this method will not work with a copper asbestos gasket that is in need of repair, but it will do the job with any of the fabric gaskets such, for instance, as the one used on the oil pan.

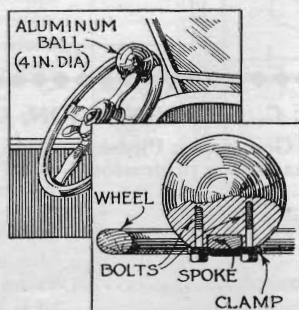


Fig. 3. Aluminum ball attached to the steering wheel aids in spinning wheel to turn the car.

MAX CHARLES PRICE, of Punta Gorda, Fla., wins this month's \$10 prize for his suggestion for extricating a mired car, shown in Fig. 1. Each month **POPULAR SCIENCE MONTHLY** awards \$10, in addition to regular space rates, for the best idea sent in for motorists. Other contributions used are paid for at the usual rates.

A Simple Homemade Jack

THE design for a homemade jack you can build easily from a few pieces of two-by-fours is shown in Figure 4. It is excellent if you have occasion to jack up your car quite frequently. A pair of these jacks will permit you to jack up both rear wheels or both front wheels at the same time for brake adjustment, and if you properly proportion the jacks to your car you will find that they can be worked very easily.

Of course a jack of this type is not suitable for general service because the throw is short. It is useful only where you wish to push it under the axle when the tire is inflated and lift the wheel a small distance from the ground. The longer the distance from the framework to

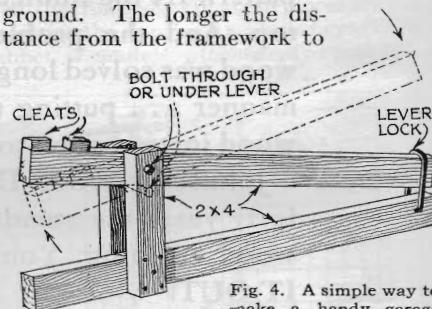


Fig. 4. A simple way to make a handy garage jack from two-by-fours.

the lever lock the easier will it be to jack up the car, and of course the shorter will be the distance that the car will be lifted. The uprights can be nailed or bolted to the bottom piece. If the latter, use a half-inch diameter bolt as a pin for the lever.

Penny Makes a Shim

WHEN you find that the ball cap on the steering apparatus fails to hold the ball on the end of the tie-rod tightly enough to prevent play, the trouble can be eliminated by taking off the cap, placing a penny over the ball, and clamping the cap in place again, as in Figure 5. The pressure will force the penny into a cup shape so that it will act as a liner for the ball cap. Use a piece of sheet copper or brass if less thickness is desired.

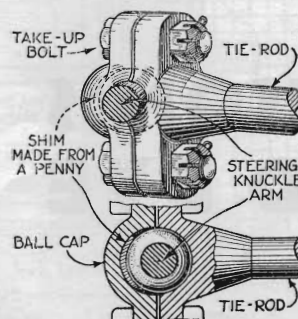


Fig. 5. A penny inserted under ball cap of steering apparatus serves as shim to stop play.

Ingenious Kinks for Motorists

Protecting the Face When Under Car—An Emergency Flange Repair—Other Useful Ideas

Each month **POPULAR SCIENCE MONTHLY** awards a prize of \$10, in addition to regular space rates, for the best idea sent in for motorists. This month's prize goes to Merrill Devore, of Cowiche, Wash., for his suggestion of a face protector useful in automobile repair work, shown in Figure 1. Other contributions published on this page are paid for at the usual space rates.

PROTECTION of the eyes and face from dirt and grease while working beneath an automobile is afforded by the ingenious homemade mask shown in Figure 1. Take a piece of celluloid, such as is used for the windows in the curtains of open cars, and with a couple of pieces of string tie it in semi-circular form about the face. It will afford complete protection for the eyes from bits of caked dirt that are sure to be loosened by hammer or screw driver.

Emergency Flange Repair

FIGURE 2 shows an emergency method of repairing a broken carburetor flange which may prove serviceable on a trip. It will do the trick until a service

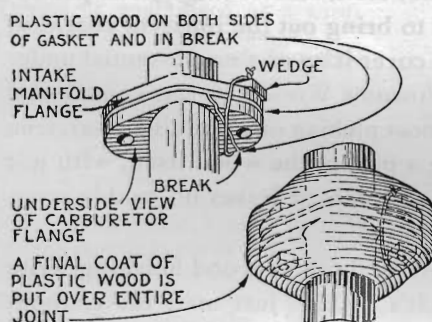


Fig. 2. An emergency repair of a broken carburetor flange, using composition wood to patch.

station or garage can be reached, and the broken flange replaced with a new one.

As shown in the illustration, the broken parts are temporarily wired together and a coating of a wood paste placed over the entire flange. After this has dried, two or three more coats of the wood paste are applied over the joint until it is in the form shown in the illustration. The repair will be surprisingly strong and also will be air-tight. Do not attempt to put a single, thick layer of the composition wood over the joint, as it will not dry as well as if applied in successive layers.

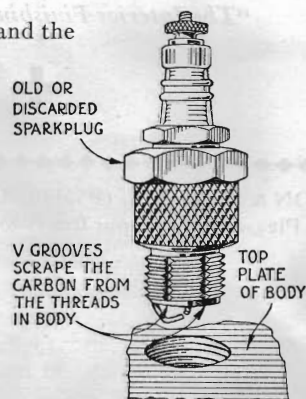


Fig. 4. Using an old spark plug to remove carbon from threads of spark plug hole.

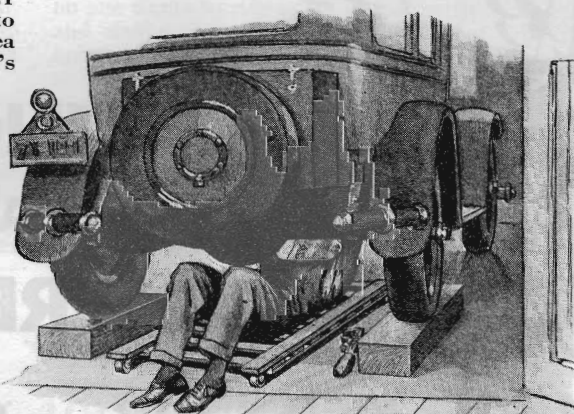


Fig. 1. How the face shield is made of a piece of celluloid.

An Inner Tube Saves Shoes

IN MANY types of cars grease has a tendency to work out, to some extent, around the bottom of the gearshift lever. The shoes of a driver are likely to come in contact with this grease and be stained. To eliminate the trouble, cut a short section from an old inner tube and slip it over the gearshift lever to the bottom, as in Figure 3. This idea will prove valuable particularly in protecting light-colored shoes. If the piece fits too loosely, it can be held in place by a thin band of rubber cut from the same tube and doubled.



Fig. 3. A piece of inner tube around gear shift base protects the shoes.

grooves across the threads of an old spark plug, as shown in Figure 4. Remove the gasket and screw the filed plug into the hole. It will seat slightly deeper than the standard plug and will remove carbon from the thread groove. A still better method, if a lathe is available, is to turn down the body of the spark plug,

just above the threaded portion, to a diameter slightly smaller than the bottom of the groove. Then slot the threaded portion with a hack saw, so that it can be screwed clear down to remove all the carbon from the bottom of the threads.

Simple Garage Door Check

FIGURE 5 shows a novel and very simple door check that will prevent the door of a garage from blowing closed. A block of wood is screwed to the door and another flat piece of board is hinged to it by means of an ordinary strap hinge. A spring is hooked between two nails, one in the fixed portion and one in the movable portion. When the movable portion is turned up the spring holds it up; when turned down the spring tends to hold it against the ground.

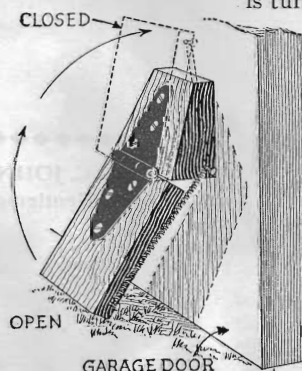
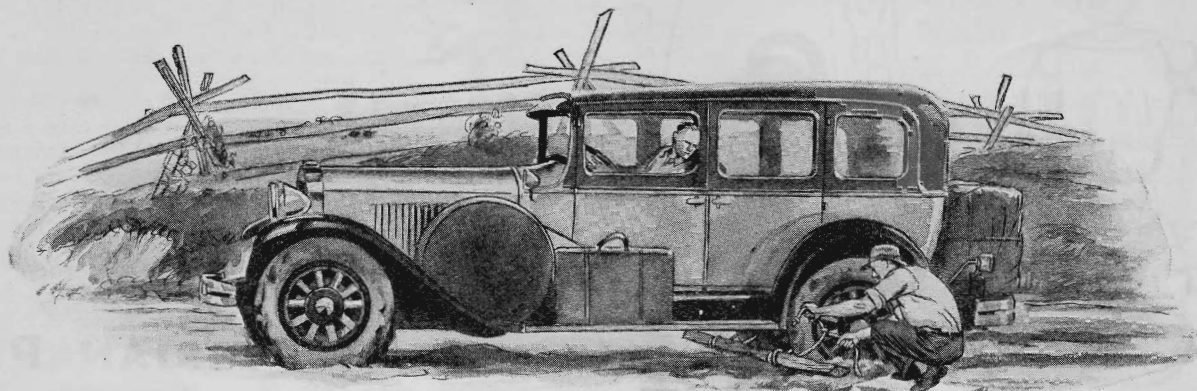


Fig. 5. A simple door check made with hinged blocks of wood and a small spring.

Front Tire Wear

Front tires on cars fitted with four-wheel brakes may wear more rapidly than the rear tires if the front brakes are set too tight. This trouble can be eliminated by making sure that the front brakes do no more than their fair share of the work of stopping the car. In most cases, however, where the front tires show excessive wear, the trouble is caused by incorrect wheel alignment.

Kinks That Solve Auto Problems



Tying a fence rail or plank in front of the rear wheels helps to get the car out of a bad mudhole.

How to Help the Car Climb Out of a Mudhole—New Ways to Do Simple Repair Jobs—Oiling Piston Rings

AN EMERGENCY method for getting a car out of a mudhole when both rear wheels have bogged down so deep that they no longer have traction is to place a plank or a fence rail in front of the rear wheels and tie it loosely to the spokes. When the car is driven ahead it will climb up on the plank and pass over it. The plank then can be untied and moved to a new position in front of the rear wheels. Repeating this procedure as many times as necessary will get the car out of the mudhole and back on solid ground again.

Oiling New Piston Rings

WHEN the motor is started after new rings have been fitted, extra lubrication should be applied to the rings during the first few minutes. Unfortunately, it is just at this time that oil from the regular lubricating system is very scant. A remedy is to plug one end of the piston pin with grease before the connecting rod is bolted to the crank shaft. The hole in the piston pin is then filled with cylinder oil and the other end plugged with grease.

As soon as the motor is started the heat melts the grease and allows the oil to run

Each month **POPULAR SCIENCE MONTHLY** awards a prize of \$10, in addition to regular space rates, for the best idea sent in for motorists. This month's prize goes to Roger Meyer, of Fond du Lac, Wis., for his suggestion for oiling new piston rings, shown in Figure 1. Other contributions published are paid for at the usual space rates.

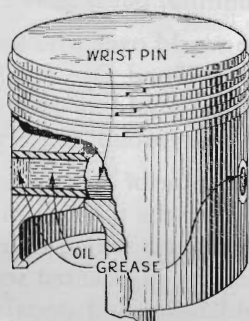


Fig. 1. Plugging piston pin with grease provides lubrication when motor is started.

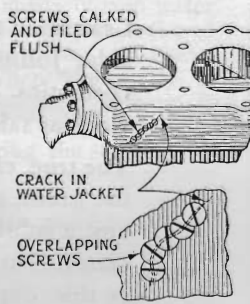


Fig. 3. How a small crack in the water jacket can be closed by a series of screws.

out where it will properly lubricate the piston rings during the critical period.

A Choke Indicator

FOR those who forget to open the choke after the motor has become warm, the indicator illustrated in Figure 2 serves as a reminder. An ordinary stop-light switch arm is attached by a wire to the choke lever on the carburetor in such a way that when the choke rod is pulled out the switch is thrown over to the "on" position.

This closes the circuit to the jeweled light indicator, fastened on the dashboard. The glowing jewel will indicate that the choke is out.

Mending Water Jacket

FIGURE 3 shows an ingenious way to close a crack in the water jacket of an automobile cylinder block. A hole drilled at the end of the crack is tapped and a

tight-fitting screw is screwed into it. The screw should be cut off flush with the cylinder jacket and another hole drilled so that it cuts through the crack and partly through the first screw. This hole is tapped, a screw run into it, and the same process continued until the entire crack is plugged by the screws. Smear the threads of the screws with a good grade of iron cement before screwing them into the holes.

Repairing Seat Cushions

BY FOLLOWING the method in Figure 4 it is possible to sew a rip in a seat cushion in such a way that the stitches are invisible, and without taking the cushion apart. If the rip has been caused by a broken holding wire this should first be repaired, as indicated. Then the rip should be sewed back and forth, over and under, leaving the stitches loose. After the sewing is completed the stitching can be pulled up tight, beginning at one end. This will close the seam so that the stitches will be hidden.

THREAD TAKEN BACK AND FORTH (OVER AND UNDER) AND AFTERWARDS DRAWN UP TIGHT

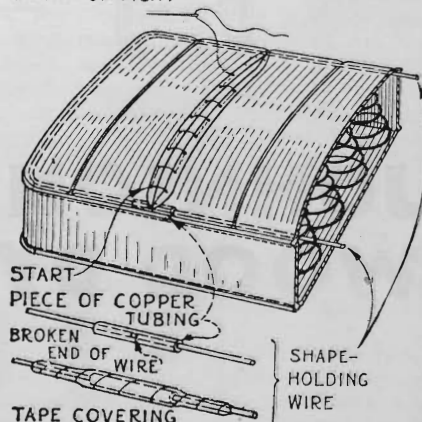


Fig. 4. Ingenious method of mending a rip in a seat cushion so that stitches are invisible.

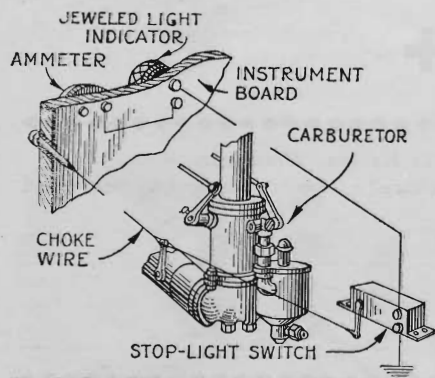


Fig. 2. Installation of a dashboard indicator that flashes when choke is left out.

How to Fix a Balky Garage Door

A Spray Gun for Oiling Hard-to-Reach Places—And Other Helpful Suggestions for the Automobile Owner

WHEN the runway to the garage is practically on a level with the garage floor, even a light fall of snow will interfere with opening the doors the full distance necessary to allow the car to drive out of the garage. Furthermore, if the approach to the garage is of concrete and the clearance is small, water getting under the concrete will freeze and lift it enough to jam against the bottom of the doors.

The illustration of Figure 1 shows one remedy. The bottom of the door is sawed off and replaced with a hinged section which can be turned up to give the door several inches clearance. If the door rests against a sill which extends across the front of the garage it will be necessary to make the hinged portion open outward, in which case the snow and ice will have to be shoveled away for an inch or two in front of the doors to permit the folding up of the lower portion, as shown.

The diagram of Figure 1 shows another method of solving the problem by replacing the lower portion of the door with a double hinged section which can be

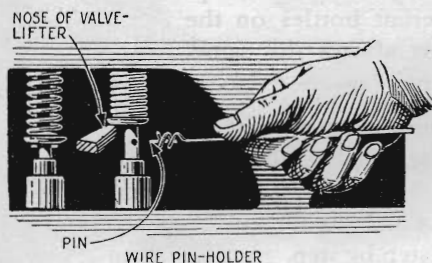


Fig. 2. Replacing a valve pin with the aid of an ingenious holder made of looped iron wire.

folded straight up. This avoids all trouble with ice or packed snow unless, of course, the snow is piled higher than the top hinge.

Simple Holder for Valve Pin

MANY jobs around an automobile are hard to do, not because they are inherently difficult from a mechanical standpoint, but because space is so limited that the hand cannot properly approach the work.

One operation of this sort is that of replacing the valve pin after the valves have been ground. With some types of valve lifters it is very difficult to hold the pin between the fingers and get it in the

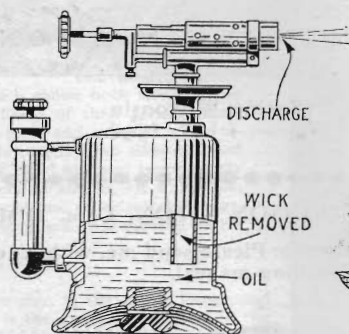


Fig. 1. A hinged section at the bottom of the door assures clearance in winter. Right: Diagram showing double hinge.

hole in the valve stem. Frequently part of the manifold or some other portion of the motor interferes with the hand. Figure 2 shows a simple remedy. Wind a wire pin-holder of iron wire. Make the loops in the end of the wire just tight enough to properly guide the pin and loose enough so that the holder can be withdrawn, leaving the pin in the hole in the valve stem. The pin will stay in the hole and pull out of the pin-holder if the holder is moved sidewise to cramp the pin in the hole.

Handy Squirt Lubricator

THE harder it is to get at a bearing to lubricate it the more likely is the lubrication to be neglected. While the modern automobile is so constructed that lubrication is as easy as possible, there are many places that still are



OIL FROM A DISCARDED TORCH

Fig. 3. An old plumbers' torch converted into a spray gun for oiling places hard to reach.

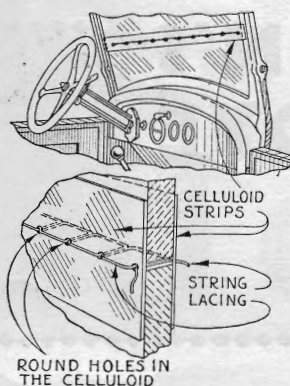


Fig. 4. Right: How to replace the rubber strip across the windshield with celluloid.

hard to reach, such as the clevis joints in the brake mechanism.

Few people like to crawl under a car just to squirt a drop of oil or two from an oil can on a clevis joint. Figure 3 shows how to avoid this trouble. Secure an old discarded plumbers' torch and remove the wick. Fill it with a mixture of light lubricating oil to which a small percentage of kerosene has been added. You will find that if you pump up a good pressure you can, with this outfit, squirt a fine stream of oil as far as fifteen feet. A little

"target practice" at the clevis joints and springs will materially reduce the wear and consequent rattle at these points. Squirting oil along the edges of the spring leaves is easy, and adequately lubricates the spring.

Windshield Gap Closer

MANY open cars are so constructed that the windshield is in two sections. Usually a rubber strip is supplied to

fit in between the two sections to keep out the rain. This strip, while effective in keeping out the rain, does not improve the car's appearance and is a disturbing black line across the line of vision.

An effective solution of the problem is shown in Figure 4. Two strips of transparent celluloid, in length equal to the width of the windshield, are perforated along their center lines with a series of holes. They should be laced in place as shown in Figure 4, pulling the lacing sufficiently tight to keep the celluloid flat against the glass.

\$10 for an Idea

EACH month POPULAR SCIENCE MONTHLY awards a prize of \$10, in addition to regular space rates, for the best idea sent in for motorists. The winner of this month's prize is D. L. Siverd, of Commodore, Pa., who suggested the garage door clearance device in Figure 1. Other contributions published are paid for at the usual rates.